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AMERICAN
RAILROAD JOURNAL,
AND
MECHANICS' MAGAZINE.

VOL. VII.—NEW SERIES.—No. 2. VOL. I.

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NEW-YORK;

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(Up Stairs.)

July 16 1838.

It is to be distinctly understood, that for the period from January to July of the current year, 1838, no numbers of the Journal will be issued; and that the volume will commence with 1st July, 1838.

* * Post MASTERS are respectfully requested, in case a subscriber has removed from the place, or does not call for the Journal, to return the numbers, and inform to what place he has removed, or the reasons assigned for not taking the numbers out of the office.

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THE undersigned beg leave to inform the proprietors of Rail Roads, that they are prepared to furnish all kinds of Machinery for Rail Roads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Rail Road, none of which have failed.—Castings of all kinds, Wheels, Axles and Boxes, furnished at the shortest notice.

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New York, February 12th, 1836.

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FRAME BRIDGES AGAIN.

The subscriber will build Frame Bridges in any part of the United States, Maryland not excepted, and will extend them to as long a span, and warrant them to be as strong, durable, and cheap as those made by any other method.

Having no patent right, he requires no agents. A large number of bridges of his construction are to be seen. Young gentlemen, who wish, can be instructed in the true mathematical principles of building bridges, and the application of the same to practice.

JOHN JOHNSON.

Burlington, Vt., Jan. 1838.

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Mill Gearing and Millwright work generally; Hydraulic and other Presses; Press Screws; Callenders; Lathes and Tools of all kinds; Iron and Brass Castings of all descriptions.

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51tf

FRAME BRIDGES.

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Bridges on the above plan are to be seen at the following localities, viz. On the main road leading from Baltimore to Washington; two miles from the former place. Across the Metawamkeag river on the Military road in Maine. On the national road in Illinois, at sundry points. On the Baltimore and Susquehanna Railroad at three points. On the Hudson and Paterson Railroad in two places. On the Boston and Worcester Railroad, at several points. On the Boston and Providence Railroad, at sundry points. Across the Contoocook river at Henniker, N. H. Across the Souhegan river, at Milford, N. H. Across the Connecticut river, at Hancock, N. H. Across the Androscoggin river, at Turner Centre, Maine. Across the Kennebec river, at Waterville, Maine. Across the Genesee river, at Squakishill, Mount Morris, N. Y. Across the White River, at Hartford, Vt. Across the Connecticut River at Lebanon, N. H. Across the mouth of the Broken Straw Creek, Penn. Across the mouth of the Cataragus Creek, N. Y. A Railroad Bridge diagonally across the Erie Canal, in the City of Rochester, N. Y. A Railroad Bridge at Upper Still Water, Orono, Maine. This Bridge is 500 feet in length; one of the spans is over 200 feet. It is probably the *firmest wooden bridge* ever built in America.

Notwithstanding his present engagements to build between twenty and thirty Railroad Bridges, and several common bridges, several of which are now in progress of construction, the subscriber will promptly attend to business of the kind to much greater extent and on liberal terms.

MOSES LONG.

Rochester, Jan. 10th, 1838.

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AMERICAN
RAILROAD JOURNAL,
AND
MECHANICS' MAGAZINE.

No. 2, Vol. I.
New Series.]

JULY 16, 1838.

[Whole No. 314.
Vol. VII.]

*To Subscribers, Engineers, Officers of Railroad and other Companies, and
Gentlemen connected with the cause of Internal Improvement and
Manufactures.*

It having been for a long time past desirable that one of the Editors of this Journal should visit the various public works and manufactories of the United States, we announce to our readers that arrangements have been made which enable us to commence such an undertaking.

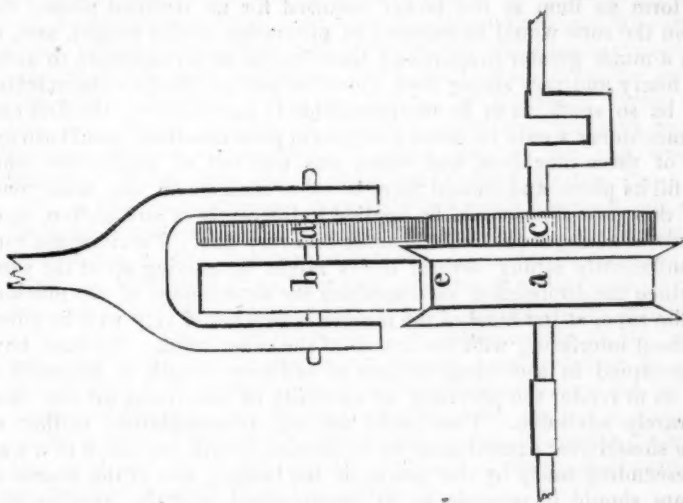
During the present and ensuing month, it is the intention of one of us to visit the public works in New-Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia, and if sufficient encouragement is offered, by the payment of balances *now due* for, and an *increased circulation* of, the JOURNAL AND MAGAZINE, to extend our tour at the present, or at an early period, over the whole Union. The object being to collect materials for a full and accurate description of all such works, embracing the plan of construction, and their present state, we desire to obtain the aid and assistance of Engineers, Directors, and all others interested. Every thing connected with Internal Improvement and Manufactures, coming under our observation, shall be noticed in a proper manner. By this means we shall not only increase the value of our Journal to its readers, but be enabled to give to the world notices and accounts of many objects of interest hitherto unnoticed and unknown.

As one important object of this excursion is to collect accounts *now due* for our periodicals, we particularly request Subscribers to be ready and prompt, in order that we may be seconded in our endeavours to increase the value of the Journal.

*Inclined Planes.**Boston, April 9, 1838.**To the Editors of the Railroad Journal:*

GENTLEMEN—I submit, with the view of eliciting the opinions of those of your professional readers who have constructed, or have the management of Railroads on which *inclined planes* exist, the following modification in this mode of action, provided you consider it of sufficient interest. The subject is at least one of considerable importance; and I feel that engineers will generally concur with me, when I say that notwithstanding the unreasonable stigma under which inclines labor at present, they form an exceedingly important auxiliary to railroads, under particular circumstances, and cannot then, (as when crossing an extensive ridge) be avoided without a great sacrifice of time and direction as well as economy. The many accidents however which have happened, and which in a majority of cases I cannot but attribute to the neglect of that efficient and constant attention, which like any piece of machinery, they ever require, has prejudiced the public mind against them. The self-acting incline, however appropriate occasionally to private roads, where the daily amount of travel and the weight of the trains can always be regulated, may be said to be altogether out of place on a public, and therefore fluctuating thoroughfare; I have therefore in view at present a comparison simply with those inclines where some motive power, whether of water or steam, is stationary at the top, for the purpose of dragging the trains up the incline. On such inclines there are generally two distinct tracks, and to each track a separate rope; the drums on which these ropes are rolled and which are set in motion by the fixed engine, act alternately to move the ascending train; the rope which is not in action for this purpose being dragged or unrolled down to one track; while the other is hauling the ascending train up the other, the descending rope, if there is a heavy descending train, assists the engine, by an appropriate gearing of the two drums. If there is no train descending, it is drawn out by a waggon used for that purpose, the return of which to perform the same service forms a subtraction from the useful effect of the engine. Another mode of action on such inclines is to apply, by means of a series of friction wheels, an endless rope as on the incline at Liverpool; and this mode, provided the rope is sufficiently strong, admits of the ascent of more than one train at a time; the loss of power however is great, in consequence of the friction necessary to ensure the constant revolution of the rope, which in this instance is moved solely by friction. According to Dr. Lardner, the rope on the Liverpool incline breaks very frequently, occasionally so often as twice in the same day. On either of these inclines the rope itself forms part of the weight to be moved, and no inconsiderable part, when taken in conjunction with the friction of the sheaves on which it rests, in proportion to the amount of this friction and strain, the rope itself must be increased in strength. If the mode of action which I suggest could be made to answer, and I by no means assert that it can, the rope would remain at rest on the incline, and therefore this force would not be expended. I shall briefly describe this mode, and then refer shortly to the points in which it differs from the modes in use at present. I must premise that it is contemplated to use a flat rope, instead of a circular one; these flat ropes are in common use on the collieries; they are probably three to four inches in width, and upwards of half an inch in thickness; they are not made by hand but by a very ingenious machine, patented by a Mr. Grimshaw, of Sunderland, in England, and their most valuable property,

and indeed that which has rendered them so generally useful, is, their perfect freedom from twist. While the circular rope was in use in the collieries, the baskets of coal ascending the shafts were continually revolving, the varying weight producing naturally the effect on the twist, uncoiling it to a degree with the loaded basket, and the elasticity of the rope resuming its former state as it descended with the empty one. This evil was of little consequence when coals were drawing, but as the same shaft and basket were used by the workmen in ascending and descending, it required some practice and a very steady head to be able to endure it; the flat rope has entirely removed this evil. My design, then, supposes that a flat rope is laid on the incline instead of a circular one; this rope to lie on occasional rests, raised a few inches above the ground; to prevent the surface water soaking into the rope, and also to ensure perfect freedom from particles of gravel or earth which cut its fibres—there would be no engine at the top of the incline, and the machine for moving the train, or *the rope engine*, would be moveable on a frame and wheels as the machinery of locomotives are at present; the rope would not be rolled up by the engine in its progression up the plane, but would merely be used successively, and then drop behind on its former ground.



In the figure, *a* and *b* are wheels of equal diameters, connected by the toothed wheels *c* and *d*, also of equal diameters; to the cranks on the axle of the lower wheel the connecting rods of the engine are supposed to be attached in the usual way; as the wheel *a* revolves, the wheel *b* will obviously perform equal revolutions in equal times, but in an opposite direction; both wheels therefore moving in equal times, and as respects their *peripheries* at the opening *e*, in the *same* direction, will have a tendency to draw in, or to pass any substance which should be placed in the opening *e*, of sufficient thickness to ensure contact on either side, and pressure in proportion to the weight of that substance, or to the load moved. This would appear to be sufficiently obvious, and it is here that it is proposed to apply the flat rope, the opening *e* occurring on the real machine or car, probably two feet above the road-bed. As the revolution of the two wheels *a* and *b* caught the rope, and therefore the rope being fixed,

induced the progression of the car on which the machine is placed, it would immediately after passing through, fall to the ground, resuming its former position on the rests. The ropes, however, used at different times on the same incline, might vary in thickness, and the upper wheel *b* must therefore be capable of variation, as well as with a view to this object as to ensure the pressure or friction necessary to prevent the rope from slipping with a given load; this would be effected by the heavy frame on which the upper roller is fixed, (and would as well slide on the frame of the lower roller, not shown here) being terminated by a screw; this screw being connected with an elliptical spring, to meet occasional variations in the thickness of the same rope—any pressure could thus be communicated to the rope, and consequently any degree of hold secured; but if the metallic surface of the rollers were used, the rope might become glazed, and the increased pressure necessary on this account might damage its fibres; it would be proper therefore to cover the peripheries of the wheels or rollers with a certain thickness of leather; it is possible that leather might answer best for the rope itself, in the manner of traces of carriages.

If I have made this description intelligible, it will be seen, that provided the application is practicable, the weight of the rope would not, as heretofore, form an item in the power required for an inclined plane; the strain on the rope would be reduced in proportion to this weight, and, in fact, in a much greater proportion; there would be no objection to using a very heavy and very strong rope, since the portion lifted by the machine would be so small, as to be unappreciable in this respect; the first cost of the machinery would be much less than at present—there would always be two of these machines, and when one was out of repair, the other would fill its place, and should there be other inclines on the same road, one of these machines could be applied indifferently to any incline, since the mode of action would be the same on every one. Provided the rope were sufficiently strong, several trains might be moving up at the same time, since the application contemplates the detachment of the machine from the rope, at the head of the incline, which could very well be effected without interfering with the action of the other trains; the time, however, occupied in ascending inclines of ordinary length, is generally so short, as to render the propriety or necessity of two trains on the same rope rarely advisable. Two tracks are still contemplated; neither we believe should ever exceed such an inclination as will not admit of a wagon descending safely by the power of the brake; one of the tracks at, any rate, should if possible be so proportioned, and the machine after performing its duty, as well as all carriages or trains for the descent, should descend by the clear track; there would consequently be no time lost in waiting on this account—the length of rope therefore necessary to the second track would be saved, as well as the sheaves; but the principal advantage would be the action admissible on the one track, independent of the other; and a greater advantage would be the simplification of the entire machinery.

The pressure upon the rope necessary to ensure such a mode of action as this, would be very great; and the question is, whether that pressure would not injure the fibres of the rope; and if it should, the question again arises, whether the simplification of machinery, and its attendant advantages, are sufficient to induce the substitution of another material in lieu of hemp, and which would not be liable to this objection. If the suggestion is of any practical importance, some of your readers may

take sufficient interest in it, either to substantiate or explain their objections: I have probably said more than enough to draw their attention to the subject.

New Railroad Route between Easton and New-York.

[The following communication from Mr. L. F. Douglass in regard to the Mine Brook Railroad and Transportation Co. will be found worthy of attention. From this it would appear to be a better route than any yet proposed for the Transportation of Coal to this city and vicinity. What will our friend *Clinton* say to this—will it not meet his views? Few routes can present so desirable an opportunity for capitalists; we wish that all interested in the cause of Internal Improvements should look to it.]

IN conformity with the provision made in a charter granted by the Legislature of New-Jersey, under the name of the Mine Brook Railroad and Transportation Company, at its Session of 1836 and '37—the exploration of the route, which was entrusted by the Commissioners to the subscriber, has been completed, which commences upon the line of the New-Jersey Railroad, either at Newark or Elizabeth Town, in Essex Co., and thence passing in almost a direct line through Springfield, Basking Ridge, Germantown, Clinton, &c. in the rich counties of Somerset, Hunterdon, and Warren, terminates at Easton, Pa.

From this examination, a more favorable result has been obtained than the most sanguine of its friends were led to expect. The distance from the Hudson to the Delaware rivers will be under 75 miles—maximum grade not to exceed 48 feet per mile—the most abrupt curvature is 1000 feet radius, and this very seldom occurs, not generally ranging below 1500 feet. These considerations, so indispensable to the successful prosecution of heavy transportation, cannot, I am confident, be embraced in any other route proposed or in contemplation between the city of New-York and Easton; and I hazard nothing in the prediction, that whatever course a Railroad may traverse in connecting the two points contemplated, *this must and will* eventually be occupied as the great channel of communication between these two points.

The Susquehanna and Delaware Railroad commences at Pittston on the Susquehanna, and running east, strikes the Delaware at the Water Gap—from thence by an extension of its charter they are at liberty to continue the line as far as Easton. This project has been partially progressed in, the exploration of the route having been made, and a large part of the capital stock subscribed; and it is the intention of that Company to proceed with the undertaking as soon as arrangements can be completed for that purpose. By a connection with this, or other existing and proposed lines, an entire Railroad communication may be had to the Susquehanna, passing in its course through the rich and inexhaustible coal mines of Luzerne, and striking upon the Susquehanna at a point that will inevitably ensure a participation in its extensive trade. From this point, following the line of communication already either in operation or in contemplation to be made, will extend this important improvement to the line of the Erie Railroad.

As the Report of the Engineer, which is now under way and will shortly appear, will enter more largely into the investigation of the particular routes to be adopted from Easton, with the detail in connexion, it was not thought advisable in this notice to anticipate its appearance with a particular description of its facilities.

There are many considerations in this proposed improvement which claim for it, and will receive the attention of your citizens.

L. F. DOUGLASS, *Eng. Mine Brook R. R. & Tran. Co.*

June 6, 1838.

The suggestions in the following extract are very good :

While writing, may I suggest to you what I think will be an advantage both to your subscribers that may wish to avail themselves of the advantages of the labor-saving inventions, and to the inventors of such machines ; and that is, in your publication or notice of them, inform us who manufactures them—where the inventor resides—his post-office—what agents he has (if any) in the *sea-port towns*, and the manufacturer's price. I would readily avail myself of several useful machines, noticed in your *Mechanics' Journal*, did I know how to procure them. To apply to a person residing a great distance from a sea-port, even at such a place as Albany, is not only inconvenient, but in many cases impracticable, both in the application and in the forwarding the machine. Every invention proven to be useful, or possessed of advantages that speak for themselves, should be placed within the reach of every citizen who may desire to possess them ; and to do this, there should be an agent fixed in one or more sea-ports, from whence they can be readily sent. To apply to the interior of a State for a small machine is out of the question with us here ; and I think you would benefit some of the numerous inventors, were you to suggest in your periodical the advantage they would derive from selling their inventions at a moderate and reasonable price, that would induce many to buy, who now refuse on account of the high price, particularly new and unestablished inventions.

Rise of the Juniata.

THE FRESHET AND STATE WORKS.—Extract to the Editor of the Philadelphia Inquirer, dated

“ CANAL ROOM, June 25, 1838.

“ Dear Sir,—I hasten to give you the particulars, so far as we have heard them, of the ruinous flood upon the Juniata. No injury has been done below the mouth of the Raystown branch ; but above the dams are all injured, and the guard locks rooted out, or so damaged as to require them to be rebuilt. It seems the weirs of the dams were too short ; they should be extended to give more width for the passage of the water. It is thought by the engineer, Mr. Bayley, who fortunately happened to be on the spot, that \$250,000 will let the water into the canal, and allow the passage of the boats ; but this cannot be done under three months. The whole cost of putting it into complete order again cannot be less than \$400,000. The river rose fifteen feet plumb water at Williamsburgh in less than fifteen hours. Messrs. Stephens and Dickey are there, and Mr. Pennybacker started yesterday. The utmost promptness will be used, and if *human* means can accomplish the repairs in less time it will be done.”

We learn from the *New-Jersey Journal*, that the New-Jersey Railroad Company have declared a dividend of 3 per cent., payable on the 16 inst.; and also from the *New-York Times*, that this Company is doing every thing within its power to accommodate the public. On Tuesday next an *extra train* will leave New-York at 11 o'clock A. M., return from New Brunswick at 5 P. M.; thereby giving passengers an opportunity to dine at New Brunswick, hear Mr. Everett's oration, and return to this city by sunset.

From the Civil Engineer and Architects' Journal.

Curtis's Railway Chairs.

The form of the rail *r*, and chair *c*, as shown in Fig. 1, is the same as those now in use; but the space for the key is made rounding in the middle, as shown in Fig. 3.

Fig. 1.

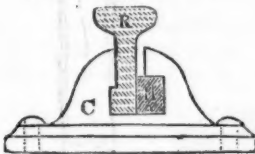


Fig. 3.

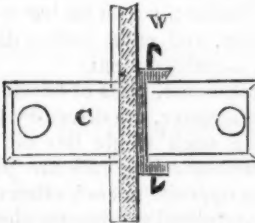
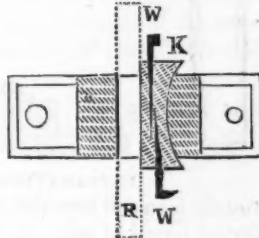


Fig. 2.

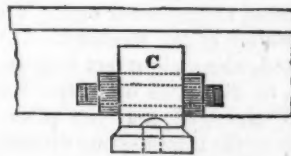


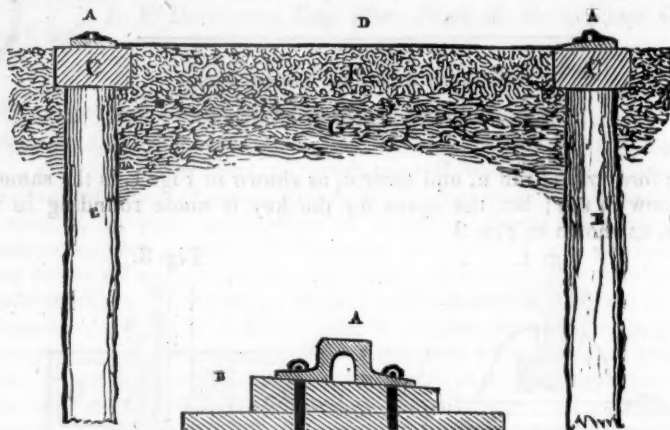
Fig. 4.

When the rail is in its place, a piece of straight grained oak, *k*, is driven into the key-way, and then folding wedges, *w*, with claw heads, are driven both sides into the oaken key; thus, the wood becomes violently compressed, and adapts itself to all the conditions of the rail and chair; and for the joint chairs, it will make no difference what may be the variations or twist in the two rails, as the wooden key will, in every case, adapt itself to circumstances, the wedges are drawn back by a set hammer, when it is necessary to take up a rail; this method will hold a rail much more steadily than either an iron or wooden key solely; the shake or jar produced by the train passing over the rails, will not affect the wedges, and they will always remain tight, particularly if care be taken to drive in the wooden keys, when they are dry, the elasticity also of the timber admits of driving the wedges tight, without breaking the chairs; it is thus clear, that the rails of every railway, of whatever figure they may be, can be secured in this manner without any difficulty; in fact, this method is not only better, but cheaper than that usually adopted.

Fig. 1 is an end view; Fig. 2 a plan. Fig. 3 a plan showing the form of the key-way and key when the wedges are driven; Fig. 4, side view.

Construction of the Great Western Railway.

This railway, on account of its deviation from the ordinary mode of constructing railways, is watched with considerable interest by the profession and the public ; it is our intention to collect as much information as we can, and lay the same before our readers ; we have taken the earliest opportunity of obtaining the particulars of the method of laying the rails, which we illustrate with an engraving.



EXPLANATION OF THE ENGRAVING.

A A wrought iron rail screwed down to the sleeper ; B a feather-edge or wedge shaped board of oak ; C C sleepers of timber ; D iron tie-bar to connect the two sleepers ; E E piles eight feet long, and eight inches diameter, pointed at the lower ends ; F ballasting, G embankment.

Formation of the Railway.—On the embankments, piles of beech trees Kyanized, about eight feet long and eight in diameter, are driven by a pile engine, at distances of fifteen feet apart, on each single line of rails, and so arranged that the piles of the corresponding rail are placed opposite to the intermediate distances, and not opposite to each other thus :
 ○ ○ ○ ○ ○ upon these piles are laid longitudinal continuous sleepers of Memel timber Kyanized, thirteen or fourteen inches wide by six and a half or seven inches thick, which are firmly bedded on the ground, previously made even and well rammed : on the top of the sleepers are laid the rails, with an intermediate distance of seven feet half an inch in clear of the rails : between the rail and the sleeper is a feather-edge or wedge shaped board of oak, or hard wood, eight inches wide and one and a half inch thick on the outer edge, and one and a quarter inch thick on the inner edge, which gives the rails a slight pitch inwards, so as to make the top coincide with the levelled or conical rim of the wheels, which touches the rails with a bearing equal to the width of the top of the rails, instead of a point, as in the ordinary mode of laying them. The rails are of wrought iron, rolled in lengths of fifteen feet, as shown in figure 2, and made hollow ; the top is two inches wide, base six inches, and height one inch and three quarters ; holes are punctured in the flanges on both sides, about eighteen inches apart, to secure the rail (*without chairs*) to the sleepers, by means of screws eight inches long. To prevent the sleepers from spreading, there are, at every fifteen feet, iron ties across the railway, spiked down at each end to the sleepers ; the surface of the roadway is finished with ballast in the usual manner.—*Ib.*

Semi-Annual Report of the Water Commissioners. From the 1st of July to 30th December, 1837, inclusive.

BOARD OF ALDERMEN, JANUARY 4, 1838.

The Water Commissioners presented their Semi-Annual Report, from the 1st of July to the 30th December, 1837, inclusive; which was laid on the table, and directed to be printed for the use of the members.

THOMAS BOLTON, Clerk.

To the Honorable the Common Council of the City of New-York:

In accordance with the provisions of the Act of the 2d May, 1834, and of the Act of the 5th of May, 1837, the Water Commissioners respectfully report:—

That they have presented to the Comptroller an account current, showing the receipts and disbursements of the Commissioners, from the first day of July last, to the 31st day of December, inclusive, which has been compared with the books kept by the Comptroller, and found correct.

The total amount expended from the commencement of the operations under the "Act to provide for supplying the City of New-York with pure and wholesome water," is as follows:

From July, 1835, to January, 1836	•	•	\$31,828 02
" January, 1836, to July, 1836	•	•	12,070 84
" July, 1836, to January, 1837	•	•	28,099 58
" January, 1837, to July, 1837	•	•	62,602 85
" July, 1837, to January, 1838	•	•	233,856 93
<hr/>			
Total amount disbursed to the last date	•	•	368,458 22
Balance in the hands of the Commissioners	•	•	5,124 45
<hr/>			

Grand total of requisitions on the Comptroller \$373,582 67

The following is a synopsis of the sums disbursed by the Commissioners from the first of July to the thirty-first of December, 1837, inclusive, presenting a condensed view of the several objects for which the money has been paid; but rendered more in detail by our account current, presented to the Comptroller:

Paid for land, embankment, office lot, and right of way	\$47,419 74
Paid the contractors on the aqueduct	169,152 00
Paid salaries to Commissioners	2,750 00
Paid salaries to Engineers, and for the incidental expenses of the corps	11,382 07
Paid for advertising, printing and stationery	325 54
Paid for incidental expenses of Commissioners, and salary of their Clerk	693 58
Paid for Chancery expenses and searches in the titles of lands for the aqueduct	2,134 00
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	\$233,856 93

In our report to your honorable body of the 3d of July last, we stated that offers to contract had been received on the 26th of April, 1837, for the whole of the sections on the first division of the aqueduct, including the dam of the Croton Reservoir; but that the state of the monetary concerns of the city and country, induced us to accept of offers for only

thirteen sections of the work, amounting in the aggregate to \$921,693, which under the circumstances alluded to, was deemed as large an expenditure as the nature of the case would warrant.

The reasons for thus restricting the contracts, having in a great measure ceased to exist, and the Engineers having completed the plans and specifications of the work on the second division of the aqueduct, the Commissioners proceeded on the 8th of August last, to give notice, by advertisement in the public papers, and by printed circulars, that proposals would be received until the 5th of September, 1837, at their office in the city of New-York, for furnishing the materials and completing twenty-seven sections of the second division, and ten sections of the first division of the Croton Aqueduct.

In the bids made for the work to be performed, in accordance with the aforesaid notice, there was a fair competition among those offering to contract, varying from eight to sixteen in number for each section. The lowest offers accepted were as follows:

FIRST DIVISION.		Brought up	
9th section, S. Roberts	\$69,385	37th Weed and Conklin	53,460
10th do. do.	49,672	38th do. O. & E. Davison	43,435
12th do. Yates & Hollister	53,985	39th do. do.	30,820
13th do. do.	59,550	40th do. W. Estabrook	37,932
14th do. Brown & Bivens	67,510	41st do. Roberts and Luud	30,823
16th do. Ferrill, Hays & Ellis	56,957	42d do. R. W. Estabrook	41,352
19th do. George Clark	43,845	43d do. Case, Delano & Ward	49,278
21st do. Delano & Carmichael	45,594	44th do. S. S. Riddle	29,724
22d do. Rutter & do.	63,984	45th do. Campbell & Bishop	81,126
23d do. James Appleton	74,809	46th do. E. Learned & Co.	31,179
24th do. do.	37,279	47th do. Banker, Veeder and Clute	37,488
25th do. S. S. Riddle	44,452	48th do. Milligan, Gilbert and Co.	43,513
26th do. John P. Brayton	28,055	49 do. Ferrell and Ellis	50,256
SECOND DIVISION.		50th do. do.	36,908
27th section, John Burrell	\$41,006	51st do. Burnham & Lobdell	49,611
28th do. George Clark	37,447	52d do. James Thomson	73,952
29th do. James Appleton	44,153	53d do. Banker & Co.	55,600
30th do. Francis Blair	47,025	The first letting, exclusive of the dam, was	1,934,162
31st do. do.	39,657	The late contract for the dam hereafter explained was	85,389
32d do. George Law	30,855	Making the total am't under contract	\$2,823,691
33d do. do.	102,310		
34th do. Taylor & Brady	40,803		
35th do. do.	41,449		
36th do. Weed & Conklin	37,923		
Carried up			

We beg leave to refer to our last report for an explanation of the method pursued in computing the several prices for which the different descriptions of work were offered to be performed.

It was found, on a further examination of the site selected for the Croton Dam, that it was not so well suited for the purpose as a location about 400 feet further down stream, and it was therefore, on the recommendation of Mr. Jervis, the Chief Engineer, decided to erect the said dam at the latter place, and to abandon the former location. This change of site made it necessary that a change should be made in the structure;

the effect of which would be to lessen materially the mason work of the dam, while it increased some other portions of the work, but of a less expensive description. The contractors, urging this change of plan as a reason, proposed abandoning the contract; and although the Commissioners were satisfied, that by the terms of the agreement, the contractors were bound to proceed with the work, notwithstanding the alteration of the plan, they nevertheless consented to a new letting of that part of the work, believing there would rather be a gain than a loss to the public by the operation. Notice was accordingly given in the usual way, on the 3d of October last, that sealed proposals would be received by the Water Commissioners, until the 6th of November, ensuing, at 3 o'clock, P. M., at their office in the city of New-York, for erecting a dam across the Croton River, with other incidental work on that portion of the Croton Aqueduct, embraced in SECTION ONE on the first division of said aqueduct.

In accordance with the foregoing notice, there were seven proposals presented to the Commissioners on the 6th of November, aforesaid, for constructing the dam; the lowest of which amounting to \$85,386, was accepted, and a contract entered into accordingly, with Henry N. B. Crandall, and William W. Van Zandt, with the requisite sureties, for the work and materials necessary to the completion of the structure. The original amount of contract for erecting said dam, at the site selected by Major Douglass, was \$117,458; making a saving to the city of \$32,169 by the change of location.

We are compelled to omit the details concerning the appraisal of the land. The circumstances attendant upon this portion of the duties of the Commissioners, are of the most vexatious nature. No opportunity of thwarting them appears to have been omitted by certain of the landholders—the list of awards will show what enormous prices they have given.

The Report also alludes to certain statements calculated to mislead and prejudice the inhabitants against the work—they in a joint affidavit made declare that the deponents had lost almost the entire product of their farms. It appears from the separate affidavits of several of these individuals, obtained by the Commissioners, that they were made to say things very different from their intention. It seems that one had some apples, another a few rails, and a third some ears of green corn stolen, but whether by the laborers on the work, or not, they were unable to say!

The Report pays the following compliment to the contractors:

The Commissioners cannot forbear expressing their entire satisfaction with the conduct of the contractors and their workmen, thus far; and that it has been in their power so amply to rebut the calumny which has been attempted to be cast upon them, is to the Commissioners as it must be to your honorable body, peculiarly gratifying.

Agreements in addition to those stated in our last report, have been concluded with the persons named below, for a right of way across their land to the aqueduct, and for other purposes, viz.:

With Joseph Hunt, for three years right of way over his land,	
with the privilege of removing earth for embankment,	\$550 00
Thomas Tompkins, for three years right of way	150 00

Carried over,

\$700 00

Water Commissioners' Report.

Brought over,	\$700 00
Abraham Leggett, for three years right of way	300 00
Edmund Bird, for the same	50 00
Albert Minnerly, for the same	160 00
Cornelius Jones, for the same	50 00
Isaac Coutant, for the same	118 75
Caleb Wildey, for the same	150 50
Richard Palmer, for three years right of way, and privilege to remove earth for embankment	550 00
Eliza Vanwart, three years right of way	90 00
Stephen B. Tompkins, the same	26 00
Jasper S. Stymets, three years right of way, and privilege to cut a ditch or drain on his land	300 00
Richard Austin, for three years right of way	90 00
Thomas Boyce, for land in fee for office at Tarrytown	150 00
White & Becker, for building said office	390 00
Aaron Ward, for three years or more of office at Sing Sing	300 00
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	\$3,424 75

In the appraisement of the 4th of November last, as before stated, there were *fifty-one owners* of separate pieces of land to be appraised, all of which was required for the aqueduct. Twenty-six of these owners have consented to receive the award of the Appraisers, provided the Commissioners shall be satisfied with their title. Twelve of them have produced the necessary certificate, and have been paid the money as follows:

Warner Willsee,	for $3\frac{622}{1000}$ acres of land, awarded	\$1,800 00
John Storms,	" $1\frac{722}{1000}$ do. do.	1,250 00
Abraham Acker,	" $\frac{91}{1000}$ do. do.	475 00
John M. Moser,	" $\frac{88}{1000}$ do. do.	40 00
Joseph A. Constant,	" $5\frac{110}{1000}$ do. do.	5,500 00
Isaac Lafurgee,	" $\frac{158}{1000}$ do. do.	125 00
Warner Field,	" $1\frac{74}{1000}$ do. do.	760 00
Peter Valentine,	" $1\frac{370}{1000}$ do. do.	650 00
John Butler,	" $1\frac{741}{1000}$ do. do.	800 00
William Archer,	" $\frac{817}{1000}$ do. do.	650 00
Samuel Archer,	" $\frac{950}{1000}$ do. do.	950 00
Ludlow, Morris & others	$2\frac{300}{1000}$ do. do.	2,300 00
		<hr/>
		\$15,300 00

The remaining cases amounting to fourteen are now before the Chancellor, to be proceeded in, conformable to the rules of his Court.

The following statement comprises the principal portions of the work which have been performed during the last season, say from the first day of June to the first day of December last.

Two thousand four hundred and fifty-five feet of the aqueduct is now complete.

There has been erected also about 400 feet of the side wall of the aqueduct ready for springing the arch.

The amount of open cutting and excavation in earth, is 146,760 cubic yards, and the same description of work in rock is 18,272 cubic yards.

The tunnellers had penetrated the rock four hundred and six feet on the first of December, and on the first of January inst., they had extended

the work to 653 feet. It is confidently anticipated that several of these tunnels will be completed during the present winter, the work progressing through the intervention of a relay of hands both day and night. The tunnel under contract to Scott & Young, in the village of Sing Sing, is now within a few feet of seeing daylight through it, and a short tunnel of 150 feet under contract to T. N. Ferrell, is cut through from end to end.

Six of the culverts are completed, and five partly finished. They vary in dimensions from two to ten feet span of the arch, and from 50 to 150 feet in length. The inverted arch or floor of the incomplete culverts are finished, so that the flow of water through the brook, passes them freely; and sufficient of the upper arch has been laid to permit the crossing of the valley with the stone embankment.

Foundation wall of the aqueduct, amounting to 12,050 cubic yards and back filling to 10,200 cubic yards has been executed.

In addition, a large amount of materials has been procured for the work, and many items of work performed, for a detailed account of which, we beg leave to refer to a tabular statement prepared by the Chief Engineer, and accompanying this report, marked A.

Here is a respectable amount of work, considering the time in which it has been performed. Its execution has not only given general satisfaction, as to its permanence and durability, through the mechanical operations of combining the various materials into a whole, but also that the practicability of completing the undertaking in a manner and style that will be an ornament to our country, and of the highest credit to the public spirit of the city of New York, and its corporate representatives, from whom the project emanated and has received a uniform support, is now beyond a doubt.

A very small number of our citizens, comparatively, have any idea of the magnitude of the work and its progress; the immense amount of mere manual labor which has, and is to be performed, in excavating and tunnelling through almost an impenetrable rock, or of mechanical labor in preparing the materials, and in the erection of the bridges, culverts, stone and foundation walls, with the aqueduct for conveying the water to the city, and other erections of a permanent and durable character: to attempt a description of which by words, is out of the question; they must be seen to be properly understood; and the Commissioners think they may appeal with confidence to those members of your honorable body who made an excursion over the line of aqueduct in the month of August last for the correctness of this opinion.

The operations of the masons was suspended on the 8th of November last, and the work placed in a condition to secure it against the frosts of winter. Provision is made in the contracts, that no hydraulic masonry shall be laid up between the 15th of October and the 1st of April; but the weather continuing mild, and the importance of forwarding this part of work, as far as possible with safety, induced an extension of the date of suspension to the 8th of November aforesaid.

It will be observed there is a much larger quantity of excavating or open cutting performed, than of any other description of work. This was owing, in a measure, to the pressure of the times, which brought forward a great number of laborers seeking employment; and to meet this emergency, permission was given to proceed with this description of labor, in order that as many of these people as practicable might be employed, rather than confine the contractors to the more important mechanical operations, on which only a few comparatively, could be engaged.

The contractors have been urged to procure as much of the stone for the erection of the culverts, to be prepared during the winter, as practicable, in order that no delay may occur in their construction at the opening of the next season. That part of the work requiring no mortar, such as stone wall for foundation and protection, rock excavation, tunnelling and earth embankment, will progress, during the winter months without abatement.

It became necessary as the business increased upon us, that offices on something like a permanent continuance, should be provided for the accommodation of the Engineers, both at Sing Sing and Tarrytown; and the Commissioners having attempted, in vain, to obtain suitable places for the purpose, they were finally drove to the necessity of purchasing a small lot of ground in Tarrytown, and erecting an office on it, for the accommodation of the Engineers on that division of the aqueduct, at a total expense of \$540. They have also taken the lease of an office at Sing Sing, to be occupied so long as an office shall be required for the business connected with the Croton Aqueduct, at a rent for the whole term of \$300.

The number of persons attached to the Engineer corps on the first of December, including the Chief Engineer, was twenty-four, they have since been reduced to ten, and will be located as follows; three at the office at Sing Sing, three at the office at Tarrytown, and four, including the Chief Engineer, at the office at New York. The services of these gentlemen will be required in effecting such instrumental surveys as may be necessary in progressing with the work to be performed during the winter; in preparing the proper working plans for the sections now under contract, and forwarding the operations required to expedite the letting of the third and fourth division of the aqueduct, at least as far down as the Harlaem River, and the crossing of that river with the aqueduct bridge.

The Commissioners deem it their duty to state, that the engineer corps, under their able head, have conducted the operations thus far (with some slight exception) with perfect satisfaction. We know of no instance of improper conduct on their part as gentlemen, and we presume there exists a reciprocity of good feeling between them and the owners of the farms through which the aqueduct is to pass. This feeling they are required to cultivate as far as practicable, and to avoid incommoding the inhabitants by any of the operations relative to the works, wherever it can be done without injury to the general plan; and the Commissioners have reason to believe they have acted up to this rule, and evinced a disposition to conciliate, by every proper means in their power, rather than contend in unimportant matters for their reserved rights. The Commissioners will embrace this opportunity of reiterating their continued approbation and confidence in the talents of John B. Jervis, Esq. their Chief Engineer. He has on all occasions, conducted the operations with much scientific knowledge, in preparing the plans and specifications of the work, and with great practical information in its execution; and they entertain not a doubt he will carry it forward to completion, with credit to himself and satisfaction to your honorable body as well as the Commissioners.

The first and second divisions now under contract, embrace a line of aqueduct of nearly twenty-one miles in length, and so soon as the Commissioners shall be placed in possession of the land, extending to the Harlaem River, and which has recently been adjudicated by the Appraisers, it is their intention, *should the means be provided*, to place so much of the third and fourth divisions under contract as shall carry the aqueduct over the river to the island of New-York, and probably to the recaiving

reservoir between 79th and 86th streets, and the 6th and 7th avenues. A work of this magnitude and importance, which is intended to last for ages, must not have its permanence and safety jeopardized by a too rapid execution of its parts; it is therefore necessary, in order that the operations should progress moderately, but steadily, that the whole line should be moving onward towards completion, at one and the same time. However desirable this has been to the Commissioners, they have, unfortunately, been prevented from carrying it into effect. The reasons have been so often alluded to and explained, that it would be useless to repeat them. The Commissioners are in hopes, however, that a better state of things is approaching, when the land owners will see that their interests have been consulted, both in the operations and conduct of the workmen, and in the measures pursued by the Commissioners.

The choice of materials, the form of the aqueduct and other appendages connected with the structure, are submitted by the Act of the Legislature, to the opinion and views of the Commissioners. In fixing upon the plan of the aqueduct, care has been taken, by proper calculations, to make it of sufficient capacity to convey, when required, the whole product of the river, or a quantity sufficient to give an ample supply for a population of one million of inhabitants. Considering also the necessity of permanence, solidity and durability in the work, means have been adopted to have the materials of the best and most lasting kind, selected by competent judges, and tested by the most approved methods in use.

The foundation of the aqueduct is stone, upon which is laid a bed of concrete, composed of broken granite and hydraulic cement; the side walls are of hammered stone, laid up with cement; the floor is composed of an inverted arch of hard brick, eight inches thick; the lining of the side walls, and upper roof arch, are of the same thickness and materials, all laid with hydraulic lime mortar. No common mortar is permitted in the whole structure. The culverts and bridges are of dressed stone, of great strength, and suitable dimensions; all laid with hydraulic cement, which undergoes the usual tests before it is passed by the Engineer.

(To be continued.)

Report of the Affairs and Prospects of the Canton Company of Baltimore.

It affords me much pleasure in submitting this report, to assure you, that, although some events of the past year have occasioned much distress throughout the commercial world, and every where depressed the market value of all kinds of property; yet, in Maryland, others have been brought about that absolutely confirm, and will soon boldly develop the intrinsic value of the estate which this Company holds. On the city of Baltimore, within and adjoining which its property lies, the general difficulties, to which I alluded, pressed comparatively but lightly. Here very few even of the most enterprising of our busy population, have been overtaken by insurmountable difficulties. The productive and commercial portions of our inhabitants have found their resources almost as much within their control, and as applicable to their ordinary operations as at any former period. But whilst the energies of individuals have been somewhat restrained, their engagements prudentially circumscribed, and their resources wisely husbanded; the public attention has been kept so steadily fixed upon the importance, expediency, nay, the absolute necessity, of constructing railroads and canals to connect this city with the North,

the South, and the interminable West, that provision has been made by the States of Maryland and Virginia; the city of Baltimore, other municipalities, and individuals, to an extent so ample as to assure the final and early completion of Roads and Canals from Baltimore, on the one hand, to and through the States of Pennsylvania and New-York; and on the other hand, to and through the State of Virginia and other Southern States, and to the navigable waters of the Lakes and Great Western Valley, pursuing the cheapest, shortest and best routes, by which the commerce and travel of those immense regions can pass to or from the Atlantic.

The changes formerly wrought in the commerce and prospects of Baltimore by the employment of steam on the Western waters, and by the internal improvements made and being annually extended by the States of New York and Pennsylvania, on the one hand; and by Virginia and other states to the South—*conclusively demonstrated* that Rail Roads and Canals must be made to connect the city of Baltimore with the fertile and vast agricultural districts and incomparably rich mineral regions of the interior, to which by geographical position she is nearer than any other Atlantic city. It was obvious to all attentive observers, that she might hold a most profitable and unbounded intercourse, by such highways, not only with the portions of our country with which she formerly traded, but also with the boundless regions watered by the Mississippi and its tributaries; and those bordering on Lakes Erie, Michigan, Superior, &c.

Many of the wisest and best citizens of Maryland, early perceiving the necessity which commands the construction of the great works by which Baltimore must, if she would hold intercourse with the adjacent and interior States, happily encouraged, and timely prevailed with their compatriots, and with the governments of the United States, of the State of Maryland, and of the city of Baltimore, to undertake such works; and these have now been so far constructed as to assure their steady prosecution to early completion.

It may therefore truly be said, that the time has quite arrived when trade and travel may pass to and from Baltimore, by continuous Rail Roads and Canals through Pennsylvania and New-York, on the North; through Virginia and other States to the South; and also to the navigable waters of the Lakes and Western States.

That the commerce of Baltimore, now expanded and prosperous, its population great and rapidly increasing, its capital large and active, will be manifold increased, so soon as these magnificent works shall be brought into actual and extended use, no one can reasonably entertain a doubt.

And it may be as safely as justly averred, that the benefits of that increase of trade, numbers, and wealth will not only be experienced and enjoyed throughout the city of Baltimore, but will be largely and promptly felt and shared by the owners of property in its vicinity, in all directions; and especially by the owners of those portions which bind on or are near to its maritime margin.

That the commerce of Baltimore, soon after the canals and railroads herein alluded to, as about to be finished, shall in fact be used, will bring into request the whole water line of her port, and the ground convenient to the same, is morally certain.

The margins of the basin are already fully occupied, and the vessels engaged in our Bay and Coasting trade now crowd its wharves—and those of Fell's Point were formerly crowded by large vessels, to the use of which they are well adapted, and of which they can accommodate a very

large number ; but all these vessels would comprize but a small portion of the vast amount of tonnage, that will, ere long, crowd every part of our harbour.

To facilitate the trade that will arise in coal, lumber, lime, granite, and other bulky commodities, large areas, extensive water fronts, and *peculiar accommodations* will be found indispensably necessary.

That these causes about to come very soon into active and vigorous operation will thenceforth make Baltimore prosper more rapidly than she has at any former period, is perfectly certain. That this growth and prosperity will be without interruption, and keep even pace with the improvement of the vast and fertile country with which she is soon to enjoy unsurpassed facilities of intercourse ; as well as with the developments of the incalculable deposits of the valuable minerals and metals, with which that country abounds, is likewise as certain as the flow of time.

Already the attention of capitalists and men of business from various parts of the Union and from Europe is anxiously directed to these places, with a view to make eligible locations, to form commercial, mining, and manufacturing associations ; and to found the most useful institutions and extensive works. The property of this Company is daily becoming more and more the subject of inquiry. Men of forecast and capital have become anxious to acquire portions of its territory. Many applications have been made to purchase parts of it ; but lots have latterly been sold only to accommodate some public works, or upon condition that they should be soon improved. Applications of this character have increased, and must rapidly multiply. It is the policy of the Company and the purpose of those to whom the management of its affairs have been confided, to favour such propositions, and to encourage by aiding those who propose to buy or lease and improve any of its lots : but the amount of the loans it may grant, to aid discreet and thrifty persons in making such improvements, will be always less than one-half the cost of the improvements, and be invariably returned at stated, short periods, and meanwhile constitute liens on lots so improved. , And the annuities that will arise under leases, flowing as they will, from property eligibly situated, well improved, and annually growing in value, will rank with the best and most esteemed securities : and at all times be saleable, and thus form a resource ever expanding and indefinitely adding to the means by which the Company may encourage and aid others in making similar improvements on lots which it may sell or lease, in numbers rapidly increasing through a series of years. Yet such improvements, quickly as they may, and most probably will be made, must nevertheless proceed but progressively ; hence it is deemed expedient to favour improvements on the grounds of the Company, especially on portions most remote from the water, with a view to their being occupied by industrious horticulturists, taking care however in locating buildings and opening avenues to fix all conformably to the general plan of the streets and avenues of the Canton grounds ; and when granting the right to cultivate land adjacent to the lots on which such buildings may stand, also taking care to reserve the privilege to the company to determine such right, in whole or part, whenever it shall sell or lease such ground for any other than agricultural purposes.

If the expectations be just, which many of the best informed citizens of Baltimore, in common with myself, sincerely entertain as to the effects which the completion of the aforementioned magnificent works of internal improvement will immediately produce and annually expand ; and if the

plans contemplated and proposed to be carried forthwith into practice by those, to whose management the affairs of this Company have been confided, shall be steadily pursued—and as I do not doubt that those expectations will be more than realized and these plans be most happily consummated, I may venture to state, as I do without the least hesitation, that the estate of this Company is worth not only all which what it has cost, but its intrinsic value so far exceeds that cost or the sum of any appraisement which I would make, that I forbear to speak more specifically, merely from a sense of duty, which, whilst it commands me not to undervalue the property of the company, at the same time, forbids me to awaken any hope that might be even measurably disappointed.

And as it appears to me to be proper, I will as frankly state to you, that I believe appraisements of the property of the company should and may be hereafter made by disinterested persons, that by this means and the accounts of the receipts and expenses of the company, annual statements of its affairs may be made upon data so full and obviously just, as will warrant the declaration and payment of dividends that will approximate the rates of income, usually derived from capital actively employed,—whilst the estate of the company shall at the same time greatly increase in value.

The company now owns upwards of twenty eight hundred acres of land which begins at Fell's Point, within the city of Baltimore, and extends eastwardly, binding very nearly three miles on the water line of the harbor, commanding much of the front upon the deepest water of this port, and therefore peculiarly fit to accommodate merchant vessels of the largest class. This property, lying partly within the limits, and closely binding on the eastern side of the third city of this Union, whether we have regard to its population, enterprise, commerce or wealth, is so situated that circumstances stamp on it a value obviously great, and which must increase largely and inevitably from year to year. Its surface is so dry as to require nothing to be done to provide for the preservation of the health usually enjoyed in this moderate and salubrious climate; excepting only at two places, of very limited extent, which will be forthwith so modified as to justify the declaration that there cannot be found a more healthful location of equal extent in any port on the Atlantic coast. Upon almost every part of its area perfectly dry and firm foundations may be had, even at great depths. And the topography of these grounds is such as to require very little labor or expense to construct the wharves, or to open and grade the avenues or streets.

Minute and extensive surveys have been made by your General Agent, Caspar W. Wever, for the purpose of forming a correct connexion of the grounds of the company with the established streets of the city. This was found to be a work of much labour and requiring the patient and persevering exercise of great skill. Several of the boundary stones of the streets of the city were found to have been incorrectly located, and an application to the City Commissioners, therefore, became necessary to have them put in their proper positions. This was done; since then, the surveys have advanced as rapidly as circumstances would permit. A portion of the grounds has been laid out into streets and blocks, in conformity to the plan adopted by the committee appointed by the Board on Improvements and Contracts, and their positions have been defined by stones firmly planted at the intersections of those streets. The remainder will be similarly laid off and bounded, without delay; and then any and every part of the grounds of the company, will be in a condition to be

disposed of, when, and as it shall be thought best. The paving of streets which had been commenced the previous year, has been completed, and several blocks of the ground are now ready for the reception of buildings.

A wharf, to supply the place of one begun in the preceding year, and which, when nearly completed, unfortunately fell, has been commenced and will be finished in the course of a few days. Its dimensions are six hundred feet in length by an average width of about fifty feet; and its position is south of and nearly parallel with Alice Anna street, and eastward from Washington street.

It will be expedient to finish the stone wharves immediately, that lie near to the east end of this new wharf, and also to prepare other and appropriate accommodations to despatch the business that will soon be transacted at such landing and on the company's grounds.

The improvements required on the small pieces of low ground that skirt a part of the margins of Harris' and Gorsuch's Creeks, to render these places herein before alluded to, as healthy as any other, will be made as soon as may be practicable.

The vast additions to the trade of this city which will be made on the opening of the great works of internal improvement now about to be completed, and which will far exceed any augmentation heretofore occasioned by kindred causes in any other state or country, will shortly require the construction of other suitable and extensive wharves, docks, and buildings, the plans for which will be timely devised and carefully executed.

Very important amendments were recently made to the charter of this Company, by one of which, its duration was extended to the first day of January in the year 1865, and its prospects never were so bright as at present.

The information and views embodied in the preceding report have been thus presented in accordance with the request made by the stockholders, assembled in general meeting on the 28th day of May last; and which request would have been sooner complied with, if it had not been deemed necessary that I should proceed to Pittsburg and Wheeling as a representative of the state of Maryland, in Canal and Railroad Companies, to assist in perfecting arrangements to complete the Baltimore and Ohio Rail Road to those cities, from which I have but just returned.

JAMES W. McCULLOH, President.

Office of the Canton Company of Baltimore, }
26th day of June, 1838. }

Hudson and Berkshire Railroad.

As this Railroad will be finished and in operation in the course of the ensuing sixty days, we think it not amiss to call public attention to it. It runs from the city of Hudson through Columbia county, to the town of West Stockbridge, in Berkshire county, Massachusetts, a distance of about thirty miles, and forms a link in the great chain of internal improvement which is intended to connect the most Eastern part of the state of Massachusetts with the Western part of the state of New York. This great chain of communication consists of a continuous line of railroads, commencing at Boston, and terminating on the Erie canal at Canajoharie. The counties through which they pass in this state are

Columbia, Green, Schoharie, and a part of Montgomery; and in Massachusetts through Middlesex, Worcester, Hampden and Berkshire.

The *Boston and Worcester Railroad*, which commences this line of roads, is already completed and in successful operation. Its length is about forty-five miles, and although costing \$30,000 per mile, it pays a handsome profit to its stockholders.

The *Great Western Railroad* commences at Worcester, and passing through Springfield and other thriving towns in Massachusetts, a distance of 108 miles, terminates at West Stockbridge, where the Hudson and Berkshire road continues the communication to the Hudson river. The Western railroad has been rapidly building for a year past, and its grading will be finished a year from this next fall. To insure its final completion, the legislature of Massachusetts at their last session loaned to the company the credit of the state, to the amount of two millions one hundred thousand dollars.

The *Catskill and Canajoharie Railroad* runs from Catskill, a few miles below Hudson, (a communication between which will be carried on by a steam ferry constructed expressly for this purpose,) to the Erie canal at Canajoharie, with a collateral branch terminating in the Erie railroad in one of our Southwestern counties. The distance between Catskill and Canajoharie is seventy miles, and the road intersects the Utica railroad a short distance from the former place. Besides being under active construction during the last year, the Catskill road obtained a loan from the legislature last winter, which will enable its managers to finish the greater portion of it the present season.

What adds greatly to the value of these roads, as well as the Hudson and Berkshire, is the fact that they are all permitted to *carry freight*, which is not the case with the Utica road, and many others chartered by our state.

In regard to the Hudson and Berkshire railroad, the estimate of freight made in 1828, at the same time the estimates were made for the Worcester and Western roads, was, for the Worcester railroad, 27,000 tons; and for the Hudson and Berkshire road, 34,000 tons—a difference of 7000 tons in favour of the latter road. But even without this difference of tonnage, the amount of tolls received for freight alone during the past year, on the Worcester road, with all the disadvantages of the times, would pay ten per cent profit on the entire capital of the Hudson and Berkshire road. This arises from the great economy used in the construction of the latter road. As an evidence of it, we insert the cost per mile of several of our principal roads, to wit:—

The Harlaem Railroad cost near \$100,000 per mile.

" Mohawk and Hudson	" 60,000	"
" Lowell	" 55,000	"
" Stonington	" 40,000	"
" Boston and Providence	" 40,000	"
" Boston and Worcester	" 30,000	"
" Utica	" 21,000	"
" Hudson and Berkshire	" 16,000	"

If the estimate of freight is correct, (and the articles of marble and iron alone already treble the amount then estimated,) it will, at one half the price now paid for tonnage by team waggons, pay a very large profit to its shareholders. In addition to freight, it is estimated that 30,000 passengers pass annually from Boston to the Hudson River, over the route

this road travels; half of this number will at half the present price produce a farther revenue of near four per cent. upon its capital. The road also passes within a few miles of Lebanon Springs, where a line of omnibusses will be established to convey passengers in less than one hour's time.

That these advantages cannot be taken from the company by any rival road which may hereafter be established, it is proper to state that this company has exclusive possession of the only practicable pass that is to be found in the great chain of mountains, that, commencing at the Highlands, run through almost the entire eastern section of the state of New York. This pass is called *Canaan Gap*, and for much of the distance is only wide enough for one road.

The road has a gentle descent toward the river, nearly the whole distance; and as two-thirds of the heavy freight will pass from east to west, the transportation will be rendered easy, and a great saving made in engines and fuel. It is principally made of second growth chestnut timber, which, having been cut for better than a year, is perfectly seasoned and durable.

The scenery along the road, particularly through the village of Claverack, is unsurpassed by any in the state; and the immense marble quarries, from whence the Gerard College at Philadelphia, and a part of our new custom-house, are being built, together with the inexhaustible iron ore beds, from whence the West Point foundry obtains the greater portion of its iron, will be interesting objects to the traveller, and a source of great profit to the company.

When it is recollected that nearly all the eastern seaport towns, such as New Bedford, Nantucket, Salem, &c. &c., send up the North river for their flour, butter, cheese, potatoes, and other agricultural products, and that a large fleet of coasting vessels are constantly engaged in this business, it will be readily perceived that the tonnage on the railroads running from the east to Boston will be greatly increased over the present estimated amount. Already have several lines of canal boats agreed to descend the river to Hudson, to meet the eastern market contemplated at Hudson—which the eastern vessels will gladly avail themselves of, in consequence of the obstructions in the navigation of the river above the city of Hudson.—*N. Y. Commercial Advertiser.*

From the Civil Engineer and Architects' Journal.

Brick and Cement Beam.

SIR,—Observing an account in your last number of the brick and cement beams which have been lately constructed by Mr. Brunel, and by Col. Pasley, of the Royal Engineers, for ascertaining the strength of materials and their aptness for certain novel applications, I beg to mention an extraordinary example of the kind, which stands exposed by the way-side on the road leading from Vauxhall to Battersea Fields. Passing in that neighborhood a few days since, to ascertain the London Terminus of the Southampton Railway, I found an erection on a plot of ground, which that Company has selected for the purpose of a depot, exactly opposite the Cement Manufactory, Nine Elms, which is described by a board affixed, as an "Experimental Brick Beam."

This erection is a brick wall 24 feet 6 inches long, 4 feet 9 inches high, and 2 feet thick. Between its second and third courses from the bottom,

two parallel lengths of slight iron hoops are inlaid, the ends of which are seen projecting ; in the fourth course from the bottom, the hoop irons are again visible at each end ; and above that, between courses seven and eight, there appears only a single length of the iron, in the next course after which there is none. The wall is raised six feet from the ground, each end resting on a pier of brick-work, *the length of twenty-one feet four inches clear between the piers being without support*, under which you may walk as under a wooden beam ! This I consider a surprising proof of the strength of adhesion of Roman Cement : you will observe, that more than double the length of the brick-work in the experiments mentioned by Col. Pasley, is here unsupported. But this is not all ; by a chain, or some other contrivance thrown over the wall at its centre, a cradle is suspended, loaded with pig-iron, and on which is inscribed the weight it contains, viz, 10 tons 14 cwt. 1 qr. 4 lbs.

If there had been the slightest elevation of the centre of this structure, forming any segment of a circle, or were there now any depression from the prodigious weight appended to it, there would be an evidence of settlement in the joints of the brick-work, or more probably of fracture in the bricks themselves ; but this is not to be discerned ; it is a perfectly horizontal brick beam, stretched, as it were, from pier to pier, over a space of twenty-one feet, supporting nearly eleven tons on its centre.

It is not for me to point out the practical advantages that may be derived from this curious experiment ; I would recommend all scientific persons, to whom it is accessible, to see it, which they may do in riding past, and I should think the application of its principle, in a vast variety of instances, must suggest itself to them. Yours, &c. A. C. E.

Essex Street, November 17, 1837.

[This beam, loaded as described, has now been standing, to our knowledge, without any appearance of fracture, for nearly two years.—
EDITOR.]

(Continued from page 32.)

Minutes and Proceedings of the Institution of Civil Engineers, containing Abstracts of Papers, and of Conversation for the Sessions of 1837.

March 7, 1837.

The PRESIDENT in the Chair.

"On Experiments on the Strength of Materials. By Thomas Webster, M. A., Sec. Inst. C. E."

The object of this paper was to point out the importance, in making experiments on the strength of materials, of beginning with weights sufficiently small. In the series of experiments on the strength of various timbers, by Lieutenant Denison, laid before the last meeting of the Institution, the first weights are in some cases too large, for from the commencement the deflection increases more rapidly than the imposed weight.

The points to be ascertained in all experiments of this kind are, first, the weight which a beam can bear, the elasticity being unimpaired, or the Elastic Weight ; and, secondly, the Breaking Weight. So long as the deflection increases in exact proportion with the increase of the weight, we may consider that the elasticity is unimpaired ; but if the deflection increases in a higher ratio, that is, if the deflection for 1 cwt. be *one* inch, and for 2 cwt. more than *two* inches, we may suspect that some violence

is done to the elastic force of the material. Thus a guide is furnished us in our observations; the weight before which this ratio is observed to change must be considered as the Elastic Weight. When a beam is to be broken, the effect of time should be noticed, and the increased deflection after a given number of seconds recorded.

The experiments of Lieutenant Denison bear out these remarks; for it will be seen, that the point at which he has noted the first permanent set, is, in very many cases, immediately after the change which is here laid down as the condition for determining the elastic weight.

With respect to the strength of materials, Mr. Cottam stated that it had often occurred to him, whether, if a beam be loaded by ever so small a quantity beyond the Elastic Weight, this beam would not in time be broken. This consideration might, he thought, explain some apparent difficulties, as when a beam breaks suddenly without any increase in the weight, but having been loaded to the same amount for many years.

Mr. Hawkins mentioned a case, in which a beam that deflected too much had been sawn down its middle and bolted up, so that its depth was increased in the centre from 10 to 11 inches. The effect of this was, that the deflection, instead of being about $1\frac{1}{2}$ inch, was only one-eighth of an inch. Was this great increase of strength to be attributed to the increase of depth simply, or to the lower half having become a truss and the upper a strut?

March 14, 1837.

The PRESIDENT in the Chair.

The decay of timber in contact with stone was discussed, and several instances were mentioned in which the only decayed part of timber was that in contact with stone. This decay is entirely obviated by inserting the wood in an iron shoe, or by placing a thin piece of iron betwixt the wood and the stone. Several cases were mentioned in which the iron shoe had been found a complete protection against dry rot and decay; a hard crust is formed on the timber in contact with the iron, which seems effectually to preserve it. It was suggested that the system of grouting must contribute to the early decay of timber; bond timber had consequently been replaced by bond iron. Bond timber is used very generally at Manchester, and answers exceedingly well, but the high temperature of the buildings may be a preventive against the decay of the timber, as the walls are very soon dried.

The subject of the strength of materials was resumed from the last meeting, and especial reference was made to the experiments by Mr. Hodgkinson on the strength of iron girders, published in the *Transactions of the Manchester Society*. In this paper Mr. Hodgkinson supposes the forces of extension and compression to have a ratio $1 : n$; and not that, within the elastic limit at least, this ratio is a ratio of equality.

Also, these experiments are directed especially to determining the form of beam which will be the strongest up to the instant of fracture; or in other words, the beam which will have the greatest breaking weight without any reference to the elastic weight.

These principles are contrary to those laid down by Tredgold, and to the opinions of many persons of great experience. Mr. Donkin and Mr. Francis Bramah maintained that within the elastic limit the forces of extension and compression are equal; that consequently within this limit the deflection will be the same, whether the beam is laid with a particular

edge highest or lowest; that a beam, for instance, whose section is a triangle, will exhibit the same deflection within the elastic limit, whether the vertex or base of the triangle be laid uppermost; beyond this limit, however, the case is different.

The strength of a beam, according to Mr. Hodgkinson's experiments, depends on the bottom flange; by increasing this he had made beams for which the breaking weights were 4000 the square inch of surface of section, whereas Tredgold's strongest forms were about 2500 the sq. inch.

March 21, 1837.

The PRESIDENT in the Chair.

"On the strength of Iron Girders, by W. B. Bray, A. Inst. C. E."

In this paper the author states the rules which had been given by Galileo, Tredgold, and Hodgkinson, for calculating the strength of iron girders. He shows by a table that Galileo's rule must be utterly false when applied to girders having large bottom flanges. Applying this rule to two girders, one of them which contains double the metal of the other, they ought to be of the same strength, whereas Mr. Hodgkinson's rule makes the former only one-half as strong as the latter. Tredgold gives no rule for the case of a large bottom flange. Thus there appears great inconsistency in these rules, and a formula applicable to all cases is still wanted.

"On Mr. Hodgkinson's Experiments on Cast Iron Girders, by Thomas Webster, M. A.; Sec. Inst. C. E."

The object of this paper was to detail the result of an examination of the above experiments, undertaken with the view of ascertaining whether those forms of beams recommended by Mr. Hodgkinson as requiring greater breaking weight have also a greater elastic weight than the more ordinary forms, with equal flanges at the top and bottom. The principle assumed by Tredgold (which also was the principle assumed by Dr. Young) is, that within the elastic limit the forces of extension and compression are equal.

Mr. Hodgkinson's experiments must be viewed as directed entirely to determining the breaking weights, and the earlier weights are not set down in many of the experiments. The weights and deflections first recorded are in many cases very near the elastic weight and point of permanent set, so that there is great difficulty in applying the principle already laid down for determining the elastic weight. But in some of the experiments which have a long series of weights, it will be seen, on comparing the increase of deflection with the increase of weight, that this ratio changes from one of equality sooner in these forms than in those with equal flanges at the top and bottom. If then these beams with large bottom flanges do possess practical advantages, it may be from their allowing a violation of the elastic limit with comparative safety; this is a state of things, however, which ought never to be contemplated.

April 4, 1837.

BRYAN DONKIN, Esq., V. P., in the Chair.

"Result of experiments made with a view to determine the best figure and position for wooden bearers, so as to combine lightness and strength; by James Horne, F. R. S.; A. Inst. C. E."

The results of several experiments on wooden bearers of different sections are tabulated; together with the dimensions and weights of the pieces, and the nature of the fracture. The conclusion at which Mr. Horne arrives is, that a triangular prism placed with its base upwards is the strongest figure and position; that with its edge uppermost the weakest for a given quantity of material.

The subject of the vibrations produced in the soil by the passage of Locomotives and Coaches was discussed, and several instances were mentioned in which the vibration of the soil was sensible at the distance of a mile and a half during an observation by reflexion. It was stated that the experiments recently made for determining the effect which the passage of the locomotives at a small distance might have at the observations on the Royal Observatory had not been conclusive; but that as no sensible effect could be produced on any observation but by those of reflexion, no apprehension of inconvenience was entertained.

It was also stated that a number of persons running down the hill in Greenwich park produces a slight tremor, which is quite sensible during an observation by reflexion, and that the shutting the outer gate of the Observatory throws an object completely out of the field of the telescope.

The comparative merits of the Single Pumping and of the Crank Engine for the purposes of raising water were discussed.

Mr. Simpson stated that it was a generally received opinion that a Single Pumping engine would do one-third more duty than a Crank engine: but that having recently had a Crank engine altered by Messrs. Maudsleys and Field, and fitted with expansion valves, it did the most duty. The two engines were worked from the same boiler. The duty of the Crank engine was about thirty-two millions; it works to a fixed lift, which is in some respects advantageous. The duty of the Cornish engines is reported at ninety-five millions, and an engine near London, in which the Cornish valves and system of clothing has been adopted, was doing a duty exceeding fifty millions.

With respect to the Cornish engines, it was stated that their superior duty is due to the system of clothing; that although many persons had examined their duty, the calculations appear to be made from the contents of the working barrel; that the Cornish bushel is 90 or 94lbs. of a very superior coal, the London bushel being only 80 or 84lbs.; that notwithstanding the great duty done by the pumping engines, the crank engines in Cornwall are doing less duty than the crank engines in London.

“Notice concerning the Thames Tunnel. By Richard Beamish, M. Inst. C. E.”

Several attempts have been made in former years to effect a communication between the opposite shores of the Thames by means of a Tunnel, all of which, however, failed. In 1798, Dodd proposed a Tunnel at Gravesend; and in 1804, Chapman projected one at Rotherhithe; and in 1807, Vazie commenced the construction of a shaft, 11 feet diameter, at a distance of 315 feet from the river. With Vazie was associated Trevelthick, a man of great practical knowledge as a miner, and by indefatigable labour a drift-way 5 feet in height, 2 feet 6 inches in breadth at the top, and 3 feet at the bottom, was carried 1,046 feet under the river. In the spring of 1808, having first ascended from under a rocky stratum,

though with a depth of at least 25 feet betwixt them and the bed of the river, the Thames broke in upon them, and not a single brick having been laid the work was irretrievably lost.

In 1823 the subject of a Tunnel was again agitated, and a company was formed to carry into execution the plans of Mr Brunel. The first proceeding was to sink a shaft. One side of a wooden platform, or curb, was then laid on this shoulder, whilst the other side rested on an iron curb, having an edge below to which it was attached. Through this curb ascended forty-eight wrought iron bolts, 2 inches diameter, to the height of 40 feet, the height to which it was proposed to raise the shaft. The regular building of the tower on the curbs with bricks laid in cement was proceeded with, and yet farther bound together by twenty-six circular hoops of timber, half an inch thick, as the brick-work was wrought up. At the top of the tower was placed another curb, and the long iron bolts passing through it, having their ends formed into the screws, the whole was screwed solidly into one mass, and completed in three works. In a week after it was finished, sixteen of the piles having been driven, two by two opposite to each other, the whole structure was sunk half an inch, carrying down with it the remaining eight piles, on which it was brought to a rest uniformly and horizontally, thus permitting the sixteen piles to be abstracted by opening the ground at the back. The whole weight supported by these eight piles was about 910 tons (the weight of the shaft.) Having been left for three weeks to dry, and gravel having been heaped under the curb, the remaining eight piles were removed, two by two, till the mass rested on a bed of gravel. The machinery, viz., the thirty-horse high pressure steam engine, with gear for raising the excavated soil, was now fixed on the top. The miners were placed inside, and by excavating from around the bottom, the whole descended by its own gravity.

Mr. Beamish then describes the peculiar difficulties which were experienced previous to the first irruption.

The chasm in the bed of the river, formed by the irruption of 1827, was stopped by bags filled with clay, with hazel rods passed through them; and the interstices filled by gravel. The irruption of 1828 was met by similar means, but the funds of the company not being then sufficient for proceeding with the work, the shield was blocked up with bricks and cement, and a wall four feet in thickness was built within the Tunnel.

For seven years the work was abandoned, till in 1835 a Treasury loan was granted, subject to the condition that the most dangerous part of the Tunnel should be executed first. On resuming the works, the first object was to provide a drain for the water from the shield, for which purpose two reservoirs were formed under the middle pier, from which drifts were formed to the bottom of the great excavation and shield. The water was abstracted from the shield at the lowest point, and the pipes of two pumps worked by the steam engine being brought into the reservoir, all the difficulty of the drainage was overcome.

The removal of the old and the introduction of the new shield was a work of no ordinary difficulty. The bricks and cement had, by the strong oxide of iron which the water contains, been converted into a mass harder than most rocks; and not less than 1646 of surface, 342 of which constituted the ceiling, had to be supported on the removal of the brick-work previous to the introduction of the new shield. The means however adopted by Mr. Brunel, and which are described in the paper, were perfectly successful.

(To be continued.)

Improvements on Canals and the Motive Power thereon.

AT page 27 of our Journal, the reader will find among the patents there mentioned as having been granted between the 28th of September and 26th of October last, the following record :—" Henry Robinson Palmer, of Great George Street, Westminster, Civil Engineer, for 'Improvements in giving Motion to Barges and other Vessels on Canals; 20th October." We are now enabled to lay before our readers some particulars of the method adopted by Mr. Palmer, and which forms the subject of his patent: these particulars we believe to be the first laid before the public.

Mr. Palmer, who, it is well known, has had extensive experience in canal and hydraulic works, has for a length of time devoted his particular attention to that complicated, and at present very imperfectly understood, *theory of rivers*, and has made a very extensive and important collection of experiments in various rivers and canals; and from the discussion of these experiments, we sanguinely look forward to some additional light being thrown upon that difficult and important subject. It was, as we understand, during these investigations that Mr. Palmer contrived the canal improvements which form the subject of his patent, and of which we shall now attempt to give some idea; but it must be understood, that the engraving attached to this article is not drawn to any proportion, but is a *sketch only*, to give a knowledge of the plan; even the details of the arrangements may possibly undergo considerable alterations by Mr. Palmer, in carrying his plan out on a large scale.

Each pond of the canal, as AB, is divided into two parts or channels C, by a wall EE; a third and short (or side) channel FF is also formed by another wall, in which two sluices I and K are inserted; these sluices connect the short channel F with a lock formed by two pair of gates in the channel C; at G, in the side channel, a *fen-wheel*, similar to an undershot water-wheel, or the paddle-wheel of a steam-vessel, is fixed, to which motion is communicated by steam or other fixed power; the revolution of this wheel communicates motion to the water in the direction from F to C, and (as it will readily be perceived) in the direction of the arrows, through the whole length of the channel C, round the extremity E of the pond, along the channel D to the further extremity, and again beneath the wheel G, and then C, as before. By this simple, but admirable contrivance, the traffic can be conveyed in both directions, and to any extent whatever, by the same power, which, if steam be the power used, can also at the same time be employed in working the



machinery of corn or saw-mills, &c., according to the demands of the neighbouring locality, and very advantageously, as the canal affords a ready means of conveying the raw material to the mill, and the subsequent produce to the distant market.

The introduction of the lock H in the channel C, appears to be the maintaining of the current in the direction of the arrows, as before stated, or the wheel would not produce the desired effect, it being necessary for the wheel to be kept out of the main channel C, that the motion of the traffic may be uninterrupted; the lock is to be so constructed, that a passing barge shall push the gates open before it for its passage; thus, suppose a large barge was passing from A towards B, it approaches the lock H with whatever impetus it may then have, the sluice I is opened by a lock-keeper, who may also have charge of the steam-engine; upon this sluice, or valve, being lifted, the water will pass from the lock, by the motion of the wheel, into the channel F and C, leaving the surface of the lock at a lower level than that of the channel D; and as the gates open inwards, the water, together with the impetus of the barge, will open them, and the barge will enter the lock, and the gates will again close; this done, the valve K is to be opened, which producing a current in the direction C, enables the barge to push open the second pair of gates, and so pass on in the direction of his route: the passage of these locks will delay the barges so little as not to be worth noticing.

Extracts from the Specification of Samuel Hall's Patent for Improvements on Steam Engines.

The objects of my invention (which invention I confine to steam engines worked by a vacuum produced by condensation) are to condense without injection water (for the purpose of creating as good a vacuum as is obtained and well known in injection engines,) the steam which passes through the engine for the working thereof, and also to condense for the most part (if not wholly) that portion of steam which usually escapes into the atmosphere through the safety-valves, when the pressure of the steam in the boiler is too high during the working of the engine, in order that the water resulting from the condensation of such steam, may be returned into the boiler. And also, further, to supply so much more distilled water to the boilers of the above mentioned description of engines, as is required to supply and replace any waste that may take place in the working thereof, in order to avoid the introduction of any water (into the boilers) containing saline or other extraneous matters.

My invention does not consist in the novelty of any of the five apparatus hereinafter mentioned, but in the combination of the whole five, or at least three out of the five, within proper proportions (as hereinafter described) as regards the first three, which I have found, by experience, to be beneficial, and from the want of knowing and observing which, I have reason to believe that all persons who have made former attempts of the same nature have failed. I now proceed to describe the above mentioned five apparatus, consisting of—

First, a sufficient quantity of metallic surfaces in the form of vessels, channels, passages, or pipes, of any convenient form, arrangement, or construction.

Secondly, a pump, or any other proper apparatus for the passing of a sufficient quantity of cold water amongst such above mentioned pipes, not

only to condense all the steam of the steam engines, but also to cool the waters resulting from the condensation thereof, to as low a temperature as (or even lower than) that of the mixture of the condensed steam and injection water which is discharged from the air pumps of injection engines, in order to produce, by such application of cold water, when used in combination with the metallic surfaces, as above stated, and with the air pump hereinafter mentioned, as good a vacuum as is obtained and well known in such injection engines, if not indeed a still more perfect vacuum. The quantity of cold water which I employ is ten gallons for such condensation of such 60,000 cubic inches per minute.

Thirdly, the ordinary air pump of the capacity hereafter stated, to produce, when in connection with the before mentioned two apparatus, a sufficiently perfect vacuum, as above defined.

Fourthly, an apparatus for distilling water to replace the waste of water that may take place in the working of the engine, in order to avoid as above mentioned, the introduction of any water into the boilers, containing saline or other extraneous matters.

Fifthly, an apparatus, which I call the steam saver, for saving the steam that usually escapes into the atmosphere from the safety valves, when it becomes of too high pressure during the working of the engine, the apparatus causing such steam to pass into the condenser to be converted into water and returned to the boiler. It may be proper here to remark, that within certain limits, which experience will readily suggest, the above mentioned proportions of metallic surfaces, of cold water, and capacity of the air pump may be varied in a certain inverse order, that is to say, if the cold water be diminished, the extent of metallic surfaces, or the capacity of the air pump, or both should be increased. And, on the other hand, if the extent of metallic surfaces be diminished, the quantity of cold water, or the capacity of the air pump, or both, should be increased to produce the same effect.

Having now described the five several apparatus, the combination of which (within proper proportions, as herein before described, as regards the first three,) constitute my invention, I proceed again to define and explain the extent of my claims; I now therefore state, that I do not claim the exclusive use of any one of the five apparatus herein described, taken separately, some of them, if not all, having been used before; nor indeed, do I claim the use of any two of them, if unaccompanied by any or either of the others; but I do claim as my invention the exclusive use of the three-fold combination of the sufficient quantity of metallic surfaces, the sufficient quantity of cold water passing among them, and the sufficiently capacious air pump, as hereinbefore fully described, whether the said three-fold combination be used alone or combined with the distilling apparatus and steam saver, or or either of them: I also claim the exclusive right of combining the distilling apparatus and the steam saving apparatus, or either of them, with the above mentioned three fold combination, or even with the two first of them, *videlicet*, the metallic surfaces and cold water passing among them, should a less air pump be used. In witness whereof, &c.

Antiquities of the Crimea.

During the last year the workmen employed in making excavations in the environs of Kertch, made some important discoveries. Near the village of Glimsche two monuments were found, one of which appears to be

seven centuries older than the other. The tomb, which is comparatively modern, contained a sarcophagus in marble, which was surrounded by valuable objects. Among them is a sort of altar-piece in marble, of a square form, and ornamented with a beautiful relief, representing a disciple of Bacchus, a silver sceptre, a gilt wooden bobbin-needle, the remains of a bridle, the bit of which is silver, and a woman's mask in gold, of the usual size, which was placed upon the body of the buried person. There were also several vases in bronze, silver, and gold; and to judge by the Greek letters inscribed upon one of the silver vases, it would appear that this sarcophagus was the sepulchre of the wife of a king Reskoreporla.—Several sovereigns of that name reigned at Panticapee. The other monument, which is of a much more ancient date, contained a sort of brick enclosure, in which was found a vase of clay, containing ashes and burnt bones. The vase is of a very elegant form, and is likely to excite attention from the beautiful drawings upon it. These are—an Amazon on horseback, attacking, lance in hand, two warriors on foot, one of which has a helmet, and the other a Phrygian cap. On no other vase previously found in Taurida has there been seen any representation of a similar subject, and this circumstance adds to its value. The horse of the Amazon is white, although the rest of the drawing is red upon a black ground, and this variety of colors is very rare upon Greek vases. The Amazon is not dressed in the costume usually given to female warriors by the artists who lived in the time of Pericles. The style of the drawing altogether gives rise to the supposition that it dates from the time of Penticapee, that is to say, the fourth or fifth century before Jesus Christ.—*Hayne Journal*

New Invented Steam-Engine.

At the British Alkali Works Stoke Prior, near Bromsgrove, a steam-engine has been invented by a laboring mechanic, and is daily in full operation, which will certainly supersede every other now in use, and that too, in a very short period of time; as the simplicity of its construction, the smallness of its size, and the almost nothingness of its cost, will necessarily bring it speedily into notice among all persons whose business may require the aid of so powerful an auxiliary. Its size is not more than twice that of a man's hat, and the expense of a five-horse power will not exceed in cost half a score pounds. Its form is cylindrical, being about eighteen inches in diameter, and twenty-two feet deep. The steam is admitted through a hole in a hollow circular belt (attached to a wall,) upon which it revolves, and works it by a diagonal action, against an upright piston, being forced out by pressure of a diagonal plate, which divides the interior into two portions. The rotary action is beautifully managed by means of a perfectly spherical steam-tight joint, at the end of a fixed inclined arm, towards which joint the upper and lower surfaces of the interior part of the cylinder are made to slope, after the form of the exterior of an hour-glass. Upon these the diagonal plate performs its revolutions, such movement being permitted through an opening (from the circumference to the centre,) equal in width to the thickness of the before-named upright piston, up and down the sides of which it continually works. To the centre of the bottom of the cylinder is fixed a shaft having attached to it a wheel which communicates the motion that may be required; and this is all the machinery of which it consists!!!

When, therefore, we consider the saving of weight of metal, size and expense, which will necessarily be gained by its adoption, and look at the incalculable advantages which such desiderata afford to steam navigation, our scientific friends will not consider us too bold in asserting that this invention will speedily revolutionize the whole system in this department of mechanics. Patents have been procured from every European government, and from the American; and no secret is made at the works in showing it to the public, either in action or in separate pieces, and in a model which is kept for the purpose.—*Civ. Eng. & Arch. Journal.*

Improvement in House Painting.—A very simple method has lately been adopted to render the surface of paint perfectly smooth, and to entirely eradicate the brush marks; it is done by means of a small roller covered with cloth or felt, about eight inches long and two inches diameter, worked in an open frame on pivots, similar to the common garden roller. The flattening coat by this method is made beautifully even.—*Id.*

Steam Navigation in Turkey.

Constantinople, 24th Nov. 1837.

Comparatively speaking, until very recently, steam vessels remained almost unknown in this country, although its waters and peculiar currents are so well adapted to develop the advantages of steam power. Within a very short period, however, a considerable number of steamers now frequent this port, and they are constantly increasing. The French Government steam-packets are appointed to arrive here every ten days from Marseilles, touching at Leghorn, Civita Vecchia, Malta, Syra, and Smyrna, and returning by the same route. They ought to perform the voyage between Marseilles and Constantinople in 13 days, but as yet they have not been regular, and several accidents have happened.

The Trieste Lloyd's Commercial Company have established a line of steamers from that port to Constantinople, which are dispatched twice a month, touching at Arrocona, Corfu, Patras, and Athens, returning by the same route. Another Austrian company, established at Vienna, make Constantinople their head-quarters, and possess several fine steamers, one of which they run between this port and Galatz; another to and from Trebizond; another to and from Smyrna; and a fourth to and from Salonica. The Russians have a steamer between this and Odessa. At present there are only three English steam-vessels stationed here, viz., the *Crescent*, trading between Constantinople and Trebizond; the *Essex*, employed as a towing vessel on the Bosphorus; and the *Levant*, formerly on the Smyrna station, but now employed on any station that may offer. The Sultan does not at present possess a single steam-vessel, but jealous possibly of his vassal, the Viceroy of Egypt's fine frigate, the *Nile*, which was here some time ago, he is now building two large ones in the arsenal, for which the engines are ordered in England. Twelve months ago the Porte possessed two old steamers, sent out from England for sale on speculation three or four years previously, but as the Turks shockingly mismanaged and wore them out, the Sultan adopted a singular expedient of getting rid of them. He was graciously pleased to recommend (order) his Rayah, or Greek subjects, to form a company for steam navigation, to supersede the *Ghiour*, or Infidel companies; and in order that his subjects might commence operations without any delay,

he liberally deprived his own navy of the only two steamers the government possessed, by selling them to his Greek subjects, himself fixing their price at 8,000*l.* for one, and 4,000*l.* for the other. In vain did the poor Greeks venture to urge that they knew nothing about steam-vessels, and did not wish to embark in such an undertaking; remonstrate they dared not, and they bowed to the Sultan's decision. The company was formed—the purchase money (fixed by the seller) was produced, and the steamers were made over to the company. The result was as quick as it was disastrous. The very first voyage attempted by the largest steamer to Smyrna she was run on shore, and her boiler burst in attempting to get her off. The smaller one was then dispatched to tow the other back to Constantinople, where she has remained ever since, perfectly useless. The next voyage attempted by the smaller steamer she was run on shore and totally lost at the Dardanelles, with much specie on board. The greatest difficulty which steam navigation in this country has to contend with, is procuring respectable and efficient engineers, so many of whom unfortunately give way to excessive drinking, or prove to be ignorant of their duties. Another drawback is, the almost impossibility of getting any serious accident to the machinery repaired here; but the oldest established Austrian company have wisely guarded against this, by having formed their own factory at Smyrna, where they repair or refit their vessels. The average price of coals laid down here from England is 40*s.* per ton.—*United Service Journal.*

Pittsburgh and Chambersburg Railroad.—On Saturday last, a gentleman informed us that he had, a few days before, conversed with Mr. Hother Hage, the engineer employed in exploring and surveying for the route of a continuous railroad, from this city to Chambersburg, and that Mr. Hage stated that he had ascertained that a railroad could be taken over the Cove Mountain, at an elevation not exceeding fifty feet to the mile. Mr. Hage further stated, that by the route referred to, the length of the road from Bedford to Philadelphia would not exceed 227 miles.

That engineer is now employed in exploring the Alleghany mountain, and is expected to complete his exploration and know the result in the course of two or three weeks.—*Pittsburgh Gazette.*

The Easton (Pa.) Argus announces the completion of the Lehigh navigation to the Great Falls. The distance is about twenty-five miles, in which a fall of six hundred feet is overcome by locks and dams, varying from fifteen to forty-five feet. The work was constructed and finished under the direction of Edward A. Douglass, Esq. the engineer of the company.

French Railroads.—The Railroad Commission in Paris is making great progress in its labors. It has decided that the three lines to be first attended to, and to be executed by the Government, should be—1st, The line from Paris to Brussels; 2nd, From Paris to Orleans; and the 3rd, From Lyons to Marseilles. Besides these to be executed by the Government, it proposes that the road from Paris to Rouen, and the branch from Amiens to Calais and Boulogne, and from Basle to Strasbourg, should be executed by railroad companies, either now existing, or which may be created. All branches and isolated lines it also thinks most desirable to reserve for the execution of companies.—*Atlas.*

ADVERTISEMENTS.

GREAT TURNPIKE LETTING ON THE ZANESVILLE AND MAYS- VILLE ROAD.

*Important to Contractors, Masons, and
Laborers, and well worth their attention.*

Sealed proposals, enclosing recommendations, will be received for the construction of sixty-six miles of the Zanesville and Maysville Turnpike Road, including Graduation, Bridging and Cover, viz: 11 miles in Muskingum county; 14 in Perry; 12 miles in Fairfield; 11 in Ross; 13 in Adams, and 5 in Brown county, Ohio. By the 20th day of July next, notes, profiles and specifications, for the respective counties will be left for the inspection of Contractors with the following persons, who are authorized to receive proposals for their respective parts of the road, viz: Solomon Sturgis in Putnam; Henry Dittus in Somerset; Elnathan Scofield in Lancaster; John Madeira in Chillicothe; A. Hollingworth in West Union, and E. Campbell in Aberdeen, opposite to Mayaville, Ky.

The Superintendent will attend on the line to read the notes and make the necessary explanations from Aberdeen to West Union on July 23d; from Chillicothe to Lancaster on the 26th; from Lancaster to Somerset on the 27th, and from Somerset to Putnam on the 28th, leaving suitable assistants to continue the explanations in his absence, although it is desirable that Contractors attend with the Superintendent on the respective parts. Proposals must be endorsed "PROPOSALS," to distinguish them from letters, and be given in by nine o'clock, A. M. on the days of letting.

The lettings, together with such further explanations as may be convenient, will proceed as follows, to wit:

That part of the road in Muskingum will be let at Putnam on the 30th of July next.

In Perry, at Somerset, on August 1st.

In Fairfield, at Lancaster, August 3d.

In Ross, at Chillicothe, on August 6th.

And at Aberdeen, for Adams and Brown, on August 9th.

Contracts will be entered into on the days of letting for the respective counties. The road in the different counties must be proposed for separately. Minor arrangements will be made known at the time.

Laborers, take Notice.

It is intended very promptly to organize a force of one thousand strong upon this road immediately after the letting, so that most of the graduation and bridging may be done this year. The district of country through which this road passes is not surpassed, if equalled, for healthiness or plentifulness in the United States.

JOHN B. WILLIAMS, Superintendent.
Lancaster, June 14, 1838.

PATENT AGENCY OFFICE AT WASHINGTON.

WILLIAM P. ELLIOTT, Artist, for many years employed in the Patent Office, will devote a portion of his time to the preparation of papers and drawings for applicants for Patents, and attend to the procuring of patents for useful inventions without the necessity of a journey to Washington; and will give information by mail, as to the originality of the same, previous to applying for patents.

All communications must be free of postage. His Office is in room No. 10. Patent Office Buildings, Washington, D. C.

Washington, April 20, 1838.

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PATENT SAFETY FUSE, For Igniting the Charge in Blasting Rocks, both in dry places and under water.

To those acquainted with and accustomed to using the Fuse, comment or description is unnecessary; to those who are not, we would simply observe, that it is an important invention to persons employed or concerned in Blasting, as by its use that hitherto dangerous operation is rendered as safe as the ordinary employments of the Farmer. It insures certainty, and effects an explosion as well under water as in the driest situation, adds much to the force of the blast, and by rendering the priming needle unnecessary, saves much time.

Numerous certificates from those who have tested the Fuse, might be given, but the following is deemed sufficient.

CERTIFICATE.

Having seen the Patent Safety Fuse for Blasting tested to our satisfaction, we cheerfully certify, that we are convinced that it saves much time and labor—adds to the force of the blast—ensures certainty, and renders blasting perfectly safe. Besides, it is we think, ~~cheaper~~ than the common straw Fuse. For dry blasting it is a great improvement; but for blasting in wet ground, it is invaluable. Messrs. F. HITCHINS & Co., contractors on the Erie canal, certify that they have been engaged in the Cornish mines, England, where the Fuse is exclusively used, and that it has never to their knowledge, caused a miscarriage. They confirm our above expressed opinion of its value. We make no doubt that it will soon be in universal use in blasting operations.

DAVID HAMILTON,

Superintendent repairs, Erie Canal.

W. J. Mc ALPINE,

Assistant Engineer Erie Canal Enlargement.

J. HOUGHTON,

Engineer Cohoes Company.

COHOES, December 16, 1837.

The Fuse is manufactured by Baron, Bickford, Eales and Co. at Simsbury, Hartford Co., Conn., orders directed to them, or either of their agents, will be promptly attended to.

Agents for selling the Patent Safety Fuse.

David Watkinson & Co., Hartford, Conn.

A. G. Hazard & Co., 135 Front-st., N. Y.

Erastus Corning & Co., 361 South Market-street, Albany, N. Y.

E. F. & A. G. Smith, 99 Exchange-street, Rochester, N. Y.

H. Kingman & Co., Buffalo, N. Y.

Curtis & Hand, 16 Commerce-street Philadelphia, Penn.

Pratt & Keith, South Charles-street, Baltimore, MD.

G. R. Peake, Richmond, Va.

W. B. Peake, Fredericksburgh, Va.

SHEET LEAD, &c.

THE Subscribers, Manufacturers of Sheet Lead, Lead Pipe, Red Lead and Litharge—have always an assortment in store, and for sale, at 175 Front Street, corner of Burling Slip.

CORNELL & TUCKER.

Sheet Lead and Lead Pipe for Fortifications and Engineering, Milled any thickness and size to order.

New-York, March 10, 1838.

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TO SUBSCRIBERS.

In consequence of the suspension, for several months, of its publication, the present, or *Seventh* volume, will be commenced on the 1st of July—instead of January, 1838: and the work will hereafter form two volumes each year.

*. The **MECHANICS' MAGAZINE**, heretofore published as a separate work, will from this date be united with the *Railroad Journal*, and the publication will hereafter bear the title of *Railroad Journal and Mechanics' Magazine*, and be forwarded to those who have paid for the *Mechanics' Magazine* to a period subsequent to July 2 1837, until they shall have received as many months of this, as they paid for that work—or until otherwise ordered, if paid for in advance.

The terms are Five Dollars per annum, in advance.

We ask the attention of contractors to the following notice of the Central Rail-Road Company of Georgia.

NOTICE TO CONTRACTORS.

Central Rail-Road of Georgia.

Sealed proposals will be received at the office of the Engineer in Savannah until the 1st day of August next, for grading twenty-one miles of this road, from the western end of the present contracts to the Ogeechee river, being one hundred miles from this city. The work will be divided into sections of three miles each, and plans and profiles ready for inspection after the 10th of July. Further lettings, including a bridge over the Ogeechee River, will take place soon after the above.

L. O. REYNOLDS, Chief Engineer.

Savannah, June 2d, 1838.

THE NEWCASTLE MANUFACTURING COMPANY

Continue to furnish at the works situated in the town of Newcastle, Delaware, *Locomotive and other Steam Engines*—Jack Screws, Wrought-iron work and Brass and Iron Castings, of all kinds connected with Steamboats, Railroads, &c. Mill Gearing of every description; Cast Wheels (chilled) of any pattern and size, with axles fitted, also with wrought Tires; Springs, Boxes and Bolts for Cars; Driving and other Wheels for Locomotives.

The works being on an extensive Scale, all orders will be executed with promptness and dispatch. Communications addressed to Mr. William H. Dobb, Superintendent, will meet with immediate attention.

ANDREW C. GRAY,

President of the Newcastle Manufact'g Co.
Newcastle, Del. March 6, 1838.

NEW ARRANGEMENT.

ROPES FOR INCLINED PLANES OF RAILROADS.
WE the subscribers have formed a co-partnership under the style and firm of Folger & Coleman, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other uses, offer to supply ropes for inclined planes, of any length required without splices, at short notice, the manufacturing of cordage, heretofore carried on by S. S. Durfee & Co., will be done by the new firm, the same superintendent and machinery are employed by the new firm that were employed by S. S. Durfee & Co. All orders will be properly attended to, and ropes will be shipped to any port in the United States.

19th month, 19th, 1836. Hudson, Columbia County, State of New-York.

ROBT. C. FOLGER.
GEORGE COLEMAN.

PATENT RAILROAD, SHIP AND BOAT SPIKES.

*. The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation, and now almost universal use in the United States, (as well as England, where the subscriber obtained a patent) are found superior to any yet ever offered in market.

Railroad companies may be supplied with Spikes having countersink heads suitable to the holes in iron rails, to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above-named factory—for which purpose they are found invaluable, as their adhesion is more than double any common Spikes made by the hammer.

*. All orders directed to the Agent, Troy, N.Y. will be punctually attended to.

HENRY BURDEN, Agent.

Troy, N.Y., July, 1831.

*. Spikes are kept for sale, at factory prices, by I & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. T. Brower, 223 Water-street, New-York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes.

1J32am

H. BURDEN.

NOTICE.—To all whom it may concern.

The undersigned gives notice that he has invented a useful improvement in the construction of Railroad Car wheels, which has been tried for several months on the Beaver Meadow Railroad. The undersigned was preparing to take out a patent of the same, when a certain Henry Moore, who had been instructed by the undersigned and employed for some time in casting said wheels, surreptitiously made a casting from his model and secretly despatched a messenger to Washington to obtain a patent for himself, which the undersigned is informed the said Moore has done, and is offering rights for sale. Now this is to notify all persons to beware of purchasing rights under said patent, as the claim of said Moore will be earnestly contested before the proper tribunals of justice.

HOPKIN THOMAS.

Beaver Meadow, March 26, 1838. Jyl-38